REMARKS

Reconsideration of this application is requested. Claims 10-13 and 19 are active in the application subsequent to entry of the Amendment.

Claims 1-9 and 14-18, directed to non-elected subject matter and withdrawn from consideration, have been canceled. This action is taken without prejudice to a divisional application or applications directed to the subject matter of these claims.

Claims 10-12 have been amended in order to more particularly point out and distinctly claim that which applicants regard as their invention following the suggestions made by the examiner in item 4 of the Official Action. New claim 19, directed to the subject matter disclosed in the specification at page 6, lines 9-10, has been added.

The present invention is directed to a unique and characteristic feature in the production of a phosphate glass, in which an oxygen gas is bubbled in a molten glass in a heated vessel and a glass raw material is charged into a position of the bubbling. The object of the present invention is to employ the bubbling gas to oxidize a formed intermediate substance that is highly capable of corroding the heated vessel, so that corrosion of the heated vessel is prevented. This is discussed in Section [0013] on page 6 of applicants' specification.

The major portion of the Official Action relates to three separate prior art-based rejections, one as to claim 10, another relating to claims 11 and 12 and a third directed to claim 13. Applicants submit that none of the documents applied in the outstanding Official Action are suggestive of the characterizing features of the present invention whether these documents are considered in combination or individually.

U.S. 4,109,888 to Verhappen et al describes a method in which a raw batch is fed to a melting zone, air or oxygen is injected into the glass that is being melted, and pellets and already molten glass are intensively mixed. Verhappen states that their method is suitable for melting borosilicate glasses which can only be melted into a homogeneous glass with difficulty in view of their high SiO_2 content (see the paragraph bridging

columns 1 and 2). However, as acknowledged by the examiner, Verhappen et al describe nothing concerning the use of such a method to a phosphate glass, the formation of a substance that is generated during melting of the glass raw material and corrodes the vessel (made of platinum or a platinum alloy) in which they are melted or preventing this corrosion by adding the glass raw material to into the vicinity of the bubbling oxygen.

Further, the pellets used in the Verhappen et al process are pellets prepared by finely pulverizing a formed glass. The patentees state in column 3, lines 12 to 20 that "... By injecting a gas, for example, air or oxygen into the melting zone, ... this foam blanket is continuously punctured ... As a result, there is always intensive mixing of discrete molten pellet particles and already molten glass". Verhappen's procedure is therefore not at all relevant to any problem caused by decomposing and reacting compounds of glass components used to form a glass.

Alexander U.S. 3,397,313 is directed to a method for preparing high purity laser and optical fiber glass. When this method is applied to the production, for example, of SiO_2-Na_2O-CaO glass, silicon, sodium and calcium as a raw material are placed in a crucible, and the raw material is heated in the atmosphere or in an atmosphere of an argon-oxygen mixture. For preventing the vaporization of raw material, an oxide layer is formed on the raw material, and sodium and calcium are melted. The temperature is further increased to melt all of the silicon. In this state, the melt is oxidized by the atmosphere, to form an SiO_2-Na_2O-CaO glass on an upper portion of the contents in the crucible The temperature is further increased, and oxygen is bubbled through the melt to oxidize the melt fully, to give SiO_2-Na_2O-CaO. Alexander discloses the preparation of a phosphate glass by this method.

In Alexander's method, the glass raw material and the melt before oxidation are in contact with the inner surface of the crucible. However, Alexander discloses nothing concerning the bubbling of oxygen carried out for the purpose of preventing corrosion caused on the inner surface of the crucible by a highly reactive substance or the introduction of glass raw material in the location where oxygen is bubbled through the

melt. For example, in column 1, line 5 from the bottom and column 2, line 13, Alexander merely state that "oxygen is bubbled through the melt to oxidize it fully" and that "the melt is fully oxidized into a GeO_2-SiO_2 glass". That is, oxygen is bubbled and used to form glass alone.

Broemer et al U.S. 4,857,487 disclose melting a phosphate glass using a metaphosphate material. However, Broemer et al are silent about charging the glass raw material while oxygen is bubbled in a molten glass.

Ogino U.S. 4,983,198 discloses a method of melting a phosphate glass, in which oxygen gas is supplied to an outer surface of a melting vessel to raise oxygen partial pressure within the atmosphere surrounding the melting vessel so as to cause the oxygen gas to penetrate through the wall of the melting vessel. The layer of molten phosphate glass is formed into a protective layer rich in oxygen (see claim 1). Ogino is not concerned with nor does it disclose that the oxygen gas is bubbled in a molten glass or that a glass raw material is charged into the position of the bubbling, in order to oxidize a formed highly corrosive intermediate substance.

Comparisons between the present invention and the references

The characterizing feature of the present invention (as defined in claim 10) is that while an oxygen gas is bubbled in a molten glass in a heated vessel, a glass raw material is charged into a position of the bubbling to form a phosphate glass. The object of the present invention is that an intermediate substance formed during the process which is highly capable of corroding the heated vessel is oxidized by the oxygen gas, so that corrosion of the heated vessel is prevented. Neither Verhappen nor Alexander disclose this objective.

Further, none of the four references discussed above disclose the feature of the present invention required by applicants' claims that while an oxygen gas is bubbled in a molten glass in a heated vessel, a glass raw material is charged into the position of the bubbling.

None of these citations disclose the function and effect of the present invention that an intermediate substance formed by decomposition under heat is oxidized by bubbling oxygen gas, so that contact of the intermediate substance with the wall of the vessel is suppressed and that the corrosion of the vessel can be prevented.

As explained above, Verhappen et al and Alexander disclose none of the above objects, procedures, functions and effects of the present invention, and the present invention is therefore not obvious over these references.

Nor do the Broemer et al and Ogino references describe or suggest the features of claim 10. Claims 11 to 13 and 19 are dependent upon claim 10, and it is therefore clear that the present claims 11 to 13 and 19 are also unobvious over any combinations of the above references by virtue of their dependencies.

For the above reasons it is respectfully submitted that the claims of this application define inventive subject matter. Reconsideration and allowance are solicited.

Respectfully submitted,

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